Archaeology and the application of artificial intelligence : case-studies on use-wear analysis of prehistoric flint tools
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Appendix I

The conceptual knowledge of the analysis procedure

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	SCORE	RULE
Retouch location	**bifacial equal** (not alternating)	perpendicular dynamic	80	retouch motion 1
		longitudinal	80	
		piercing	40	
		transverse	40	
		transverse	20	
	bifacial equal (alternating)	longitudinal	80	retouch motion 22
	dorsal only	transverse	60	retouch motion 2
		perpendicular dynamic	20	
		longitudinal	20	
		piercing	20	
	bifacial, dorsal more	transverse	40	retouch motion 3
		perpendicular dynamic	40	
		longitudinal	20	
		piercing	20	
		diagonal	20	
	ventral only	transverse	60	retouch motion 4
		longitudinal	20	
		piercing	20	
		perpendicular dynamic	20	
	bifacial, ventral more	transverse	40	retouch motion 5
		perpendicular dynamic	40	
		longitudinal	20	
		piercing	20	
	point (one facet)	diagonal	90	retouch motion 33
	point (multiple facets)	boring	60	retouch motion 44
		diagonal	40	
		piercing	40	
Retouch distribution	**overlapping**	boring	60	retouch motion 6
		diagonal	40	retouch motion 7
		longitudinal	40	retouch motion 9

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	SCORE	RULE
		perpendicular dynamic	40	retouch motion 38
		hard material	40	expert knowledge 9
		transverse	20	retouch motion 8
	uneven	longitudinal	60	retouch motion 10
		transverse	40	retouch motion 11
		boring	20	retouch motion 12
		diagonal	20	retouch motion 13
		perpendicular dynamic	20	retouch motion 39
		piercing	20	retouch motion 40
	close	piercing	90	retouch motion 42
		transverse	60	retouch motion 14
		longitudinal	40	retouch motion 15
		medium hard material	40	expert knowledge 10
		diagonal	20	retouch motion 41
	single break	perpendicular dynamic	60	retouch motion 16
		boring	20	retouch motion 17
		diagonal	20	retouch motion 18
	clumped	piercing	20	retouch motion 43
		boring	—	retouch motion 19 (remark only)
		diagonal	—	retouch motion 20 (remark only)
		longitudinal	—	retouch motion 21 (remark only)
		perpendicular dynamic	—	retouch motion 22 (remark only)
		transverse	—	retouch motion 24 (remark only)
	multi generation	perpendicular dynamic	60	retouch motion 25
		piercing	—	retouch motion 25
		boring	—	retouch motion 25
		diagonal	—	retouch motion 25
		longitudinal	—	retouch motion 25
		transverse	—	retouch motion 25
		soft material	xx	expert knowledge 7
		hard material	40	expert knowledge 71
Retouch orientation	**perpendicular**	transverse	80	retouch motion 26
		boring	80	retouch motion 27
		perpendicular dynamic	80	retouch motion 28
		piercing	40	retouch motion 45
	diagonal	perpendicular dynamic	80	retouch motion 29
		longitudinal	80	retouch motion 30
		diagonal	80	retouch motion 37

— means that the motion/material does not receive a score, but is not excluded either

xx means that the motion/material is excluded from the analysis

Variable	Wear feature	Motion/Material	Score	Rule
	even mix	boring	20	retouch motion 31
		longitudinal	20	retouch motion 34
		diagonal	20	retouch motion 32
		perpendicular dynamic	20	retouch motion 35
		piercing	20	retouch motion 46
Retouch length	**very small**	medium hard material	40	retouch wth 1
		soft material	80	retouch wth 9
		perpendicular dynamic	xx	retouch wth 1/9
		piercing	xx	retouch wth 1/9
	small	medium material	40	retouch wth 2
		soft material	60	retouch wth 3
		perpendicular dynamic	xx	retouch wth 2/3
		piercing	xx	retouch wth 2/3
	medium	hard material	40	retouch wth 6
		medium hard material	60	retouch wth 4
		soft material	20	retouch wth 5
		perpendicular dynamic	xx	retouch wth 4/5/6
		piercing	xx	retouch wth 5
	large	hard material	80	retouch wth 7
		medium hard material	20	retouch wth 8
		perpendicular dynamic	40	retouch wth 7/8
		piercing	40	retouch wth 7/8
	very large	hard material	60	retouch wth 10
		perpendicular dynamic	60	
		piercing	60	
		boring	xx	
		diagonal	xx	
		longitudinal	xx	
		transverse	xx	
Retouch termination & no rounding	**mostly step**	hard material	80	retouch term1
		medium hard material	40	
		soft material	20	
	mostly hinge	hard material	60	retouch term 2
		medium hard material	40	
		soft material	20	
	mostly feather	soft material	60	retouch term 3
		medium hard material	40	
		hard material	20	
	snap	hard material	—	retouch term 8 (remark only)
		medium hard material	—	retouch term 9 (remark only)
		soft material	—	retouch term 10 (remark only)

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	SCORE	RULE
	feather & hinge equal	hard material	20	retouch term12
		medium hard material	60	
		soft material	20	
	feather & step equal	hard material	40	retouch term13
		medium hard material	40	
		soft material	20	
	hinge & step equal	hard material	80	retouch term14
		medium hard material	40	
		soft material	20	
	comminution	hard material	80	retouch term19
		perpendicular dynamic	60	
		piercing	40	
		boring	xx	
		diagonal	xx	
		longitudinal	xx	
		transverse	xx	
Retouch termination & slight rounding	**mostly step**	hard material	80+20	retouch term 4
		medium hard material	20	
	mostly hinge	medium hard material	60+20	retouch term 5
		soft material	20	
		medium hard material	20	
	mostly feather	medium hard material	60+20	retouch term 6
		soft material	40	
		hard material	20	
	snap	hard material	—	retouch term 8 (remark only)
		medium hard material	—	retouch term 9 (remark only)
		soft material	—	retouch term 10 (remark only)
	feather & hinge equal	medium hard material	60+20	retouch term 15
		soft material	20	
		hard material	20	
	feather & step equal	hard material	40+20	retouch term 23
		medium hard material	40	
		soft material	20	
	hinge & step equal	hard material	80+20	retouch term 22
		medium hard material	40	
		soft material	20	

(+ 20 = extra score due to presence of slight edge rounding)

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Variable	Wear feature	Motion/Material	Score	Rule
	comminution	hard material	80+20	retouch term 21
		perpendicular dynamic	60	
		piercing	40	
		boring	xx	
		diagonal	xx	
		longitudinal	xx	
		transverse	xx	
Termination & heavy rounding	**mostly step**		xx	
	mostly hinge		xx	
	mostly feather	medium hard material	60+20	retouch term 7
	snap	hard material	—	retouch term 8 (remark only)
		medium hard material	—	retouch term 9 (remark only)
		soft material	—	retouch term 10 (remark only)
	feather & hinge equal	medium hard material	60+20	retouch term 16
	feather & step equal	medium hard material	60+20	retouch term 17
	hinge & step equal	medium hard material	40+20	retouch term 18
	comminution	all materials	xx	
Rounding, no retouch	**slight rounding**	medium hard material	60	rnd1
		soft material	40	
	heavy rounding	medium hard material	80	rnd2
Polish location	**bifacial equal**	perpendicular dynamic	60	polish motion 1
		diagonal	40	
		piercing	40	
		longitudinal	40	
		transverse	20	
		boring	20	
	dorsal only	transverse	60	polish motion 2
		perpendicular dynamic	40	
		piercing	20	
		longitudinal	20	
	bifacial, dorsal more	transverse	60	polish motion 3
		perpendicular dynamic	40	
		longitudinal	40	
		piercing	20	
	ventral only	transverse	60	polish motion 4
		perpendicular dynamic	40	

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	SCORE	RULE
		longitudinal	20	
		piercing	20	
	bifacial, ventral more	transverse	60	polish motion 5
		piercing	20	
		longitudinal	20	
		perpendicular dynamic	20	
		diagonal	20	
	point (one facet)	diagonal	40	polish motion 22
		piercing	20	
	point (multiple facets)	boring	60	polish motion 23
		piercing	40	
		diagonal	40	
Polish directionality	**perpendicular**	perpendicular dynamic	80	polish motion 6
		transverse	60	polish motion 8
		piercing	40	polish motion 24
		boring	20	polish motion 7
		diagonal	20	polish motion 9
		polish '23'	20	expert knowledge 13 + 14
	diagonal	diagonal	80	polish motion 10
		longitudinal	40	polish motion 12
		transverse	20	polish motion 11
		perpendicular dynamic	20	polish motion 18
		piercing	20	polish motion 26
	parallel	longitudinal	60	polish motion 13
		boring	20	polish motion 14
		diagonal	20	polish motion 15
	random	transverse	20	polish motion 16
		longitudinal	20	polish motion 17
		perpendicular dynamic	20	polish motion 19
		boring	20	polish motion 20
		diagonal	20	polish motion 21
		piercing	20	polish motion 25

VARIABLE	WEAR FEATURE	MOTION/material	N	%	PF	RULE
Polish distribution	**greasy lustre**	leather (8)	3	38	40	polish dist 1
		meat and fish (20)	6	30	30	
		soft wood (41)	6	15	20	
		hard wood (10)	1	10	10	

N = the frequency of occurrence

Variable	Wear feature	Motion/material	N	%	PF	Rule
		soaked antler (12)	1	8	10	
		soaked bone (50)	2	4	10	
		hide (24)	1	4	10	
	streaks	shooting (6)	6	100	100	polish dist 2
		fish scaling (6)	3	50	50	
		leather (8)	2	25	30	
		non sil.plants (8)	1	12	20	
		soft wood (41)	1	2	10	
		sil.plants (23)	1	4	10	
		shell (4)	1	25	10*	
	isolated spots	soaked bone (50)	38	76	80	polish dist 3
		hard wood (10)	6	60	60	
		dry antler (2)	1	50	50	
		soaked antler (12)	6	50	50	
		meat and fish (20)	7	35	40	
		hide (24)	5	21	30	
		leather (8)	2	25	30	
		soft wood (41)	7	17	20	
		fish scales (6)	1	17	20	
		shell (4)	3	75	10 *	
		pottery (2)	2	100	10 *	
		sil.plants (23)	2	8	10	
		cereals (21)	1	5	10	
		stone (1)	1	100	10 *	
		teeth (1)	1	100	10 *	
		dry clay (0)	—	—	10	
	spread	soil (5)	5	100	90	polish dist 4
		cereals (21)	13	62	70	
		non sil.plants (8)	5	63	70	
		sil.plants (23)	6	26	30	
		dry clay (6)	1	17	20	
		soft wood (41)	3	7	10	
		soaked bone (50)	2	4	10	
		soaked antler (12)	1	8	10	
	band along the edge	dry clay (6)	5	83	90	polish dist 5
		hide (24)	16	67	70	
		sil.plants (23)	11	48	50	
		soaked antler (12)	4	33	40	
		cereals (21)	7	33	40	
		fish scales (6)	2	33	40	
		soft wood (41)	10	24	30	
		hard wood (10)	2	20	20	
		leather(8)	1	13	20	
		soaked bone (50)	8	16	20	
		meat and fish (20)	1	5	10	
		non sil.plants (8)	1	13	10	

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	N	%	PF	RULE
	reticulated	soft wood (41)	9	22	30	polish dist 6
		hard wood (10)	2	20	20	
	spots & streaks	meat and fish (20)	4	20	20	polish dist 7
	thin line along the edge	sil.plants (23)	3	13	20	polish dist 8
		dry antler (2)	1	50	10 *	
		fresh hide (24)	2	8	10	
		meat and fish (20)	2	10	10	
		soft wood (41)	4	10	10	
		non sil. plants	—	—	10	
		leather	—	—	10	
		hard wood	—	—	10	
		soaked bone	—	—	10	
		soaked antler	—	—	10	
		dry clay	—	—	10	
		pottery	—	—	10	
		fish scales	—	—	10	
		shell	—	—	10	
		stone	—	—	10	
		teeth	—	—	10	
	bevel	soaked bone (50)	7	14	20	polish dist 9
		hard wood	—	—	10	
		transverse	—	—	80	expert knowledge 4
		boring	—	—	xx	expert knowledge 41
		diagonal	—	—	xx	expert knowledge 43
		longitudinal	—	—	xx	expert knowledge 44
		perpendicular dynamic	—	—	xx	expert knowledge 45
		piercing	—	—	xx	expert knowledge 42
	melting snow field	transverse	—	—	40	polish dist 10
		soaked antler (12)	—	—	30	
	band away from the edge	meat and fish (20)	—	—	50	polish dist 11
		fish scales (6)	—	—	50	
		longitudinal	—	—	80	expert knowledge 3
		boring	—	—	xx	expert knowledge 31
		diagonal	—	—	xx	expert knowledge 33
		transverse	—	—	xx	expert knowledge 34
		perpendicular dynamic	—	—	xx	expert knowledge 35
		piercing	—	—	xx	expert knowledge 32
	Band along the edge, or spread	polish '23' (side one)	—	—	20	polish dist 12 + 13
Polish brightness & texture	**very bright & smooth/matt**	cereals (21)	18	86	90	polish combi 4
		sil.plants (23)	19	83	90	polish combi 2
		soaked antler (12)	8	67	70	polish combi 5
		soft wood (41)	23	56	60	polish combi 3

Variable	Wear feature	Motion/material	N	%	PF	Rule
		hard wood (10)	5	50	50	polish combi 1
		non-sil.plants (8)	4	50	50	polish combi 6
		soaked bone (50)	23	46	50	polish combi 8
		polish '23'	—	—	20	polish combi 49 + 51
	very bright & rough/matt	dry clay (6)	6	100	100	polish combi 22
		soil (5)	5	100	100	polish combi 21
		shooting (6)	3	50	50	polish combi 20
		soaked antler (12)	1	8	10	polish combi 10
		meat and fish (20)	2	10	10	polish combi 14
		soaked bone (50)	6	12	10	polish combi 15
		hide (24)	2	8	10	polish combi 9
		soft wood (41)	1	2	10	polish combi 47
		leather (8)	1	13	10	polish combi 7
	bright & smooth/matt	hard wood (10)	5	50	50	polish combi 17
		soft wood (41)	11	27	30	polish combi 16
		soaked antler (12)	2	17	20	polish combi 13
		meat and fish (20)	4	20	20	polish combi 26
		non sil.plants (8)	1	13	20	polish combi 24
		sil.plants (23)	3	13	20	polish combi 11
		cereals (21)	1	5	10	polish combi 25
		limestone (1)	1	100	10 *	polish combi 29
		soaked bone (50)	4	8	10	polish combi 12
		dry antler (2)	2	100	10 *	polish combi 23
	bright & rough/matt	shooting (6)	3	50	50	polish combi 28
		non sil.plants (8)	1	13	20	polish combi 18
		meat and fish (20)	3	15	20	polish combi 32
		teeth (1)	1	100	10 *	polish combi 27
		shell (4)	3	75	10 *	polish combi 30
		pottery (2)	2	100	10 *	polish combi 31
		soaked bone (50)	4	8	10	polish combi 19
		dry clay	—	—	10	polish combi 53
	bright & rough/greasy	hide (24)	13	54	60	polish combi 34
		fish scales (6)	2	33	40	polish combi 37
		leather (8)	1	13	20	polish combi 33
		meat and fish (20)	2	10	10	polish combi 35
		soaked antler (12)	1	8	10	polish combi 36
	dull & rough/matt	fish scales (6)	3	50	50	polish combi 45
		leather (8)	1	13	20	polish combi 38
		polish '23'	—	—	20	polish combi 50 + 52
		meat and fish (20)	1	5	10	polish combi 41
		soaked bone (50)	4	8	10	polish combi 42
		soft wood (41)	1	2	10	polish combi 43
		hide (24)	2	8	10	polish combi 39
		soaked antler	—	—	10	polish combi 48

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	N	%	PF	RULE
	dull & rough/greasy	leather (8)	4	50	50	polish combi 44
		hide (24)	6	25	30	polish combi 40
		meat and fish (20)	4	20	20	polish combi 46
Polish width	**0-250**	meat and fish (20)	13	65	70	polish wth 1
		teeth (1)	1	100	10 *	polish wth 14
		dry antler (2)	2	100	10 *	polish wth 20
		soaked antler (12)	7	58	60	polish wth 29
		soaked bone (50)	36	72	80	polish wth 31
		hide (24)	13	54	60	polish wth 39
		leather (8)	5	63	70	polish wth 45
		soft wood (41)	18	44	50	polish wth 51
		hard wood (10)	6	60	60	polish wth 52
		shell (4)	1	25	10 *	polish wth 53
		sil.plants (23)	5	22	30	polish wth 54
		non sil.plants (8)	1	13	20	polish wth 55
		cereals (21)	4	19	20	polish wth 56
		fish scales (6)	2	33	40	polish wth 9
		limestone	—	—	10	polish wth 58
		pottery	—	—	10	polish wth 59
		dry clay	—	—	10	polish wth 60
	251-500	fish scales (6)	3	50	50	polish wth 4
		hide (24)	5	21	30	polish wth 5
		meat and fish (20)	5	25	30	polish wth 10
		leather (8)	1	13	20	polish wth 3
		hard wood (10)	2	20	20	polish wth 6
		soft wood (41)	6	15	20	polish wth 7
		sil.plants (23)	2	9	10	polish wth 8
		soaked antler (12)	1	8	10	polish wth 12
		soaked bone (50)	3	6	10	polish wth 11
		cereals (21)	1	5	10	polish wth 13
		limestone (1)	1	100	10 *	polish wth 2
		pottery	—	—	10	polish wth 61
		dry clay	—	—	10	polish wth 62
		polish '23'	—	—	10	polish wth 63 + 64
	501-750	hard wood (10)	2	20	20	polish wth 15
		soft wood (41)	2	5	10	polish wth 16
		meat and fish (20)	1	5	10	polish wth 17
		hide (24)	1	4	10	polish wth 18
		soaked bone (50)	1	2	10	polish wth 19
	751-1000	soaked bone (50)	8	16	20	polish wth 21
		dry clay (6)	1	17	20	polish wth 22
		non sil.plants (8)	1	13	20	polish wth 23
		cereals (21)	3	14	20	polish wth 25
		fish scales (6)	1	17	20	polish wth 26
		soft wood (41)	5	12	20	polish wth 28
		hide (24)	1	4	10	polish wth 30

Variable	Wear feature	Motion/material	N	%	PF	Rule
		meat and fish (20)	1	5	10	polish wth 27
		sil.plants (23)	2	9	10	polish wth 24
	1001-2000	dry clay (6)	2	33	40	polish wth 32
		sil.plants (23)	4	17	20	polish wth 33
		hide (24)	4	17	20	polish wth 35
		leather (8)	1	13	20	polish wth 34
		soft wood (41)	7	17	20	polish wth 36
		meat and fish	—	—	20	polish wth 65
		polish '23'	—	—	20	polish wth 63 + 64
		cereals (21)	2	10	10	polish wth 37
		soaked antler (12)	1	8	10	polish wth 38
	2001-5000	non sil.plants (8)	3	38	40	polish wth 40
		dry clay (6)	2	33	40	polish wth 42
		cereals (21)	5	24	30	polish wth 41
		sil.plants (23)	5	22	30	polish wth 43
		meat and fish	—	—	20	polish wth 66
		polish '23'	—	—	20	polish wth 63 + 64
		soft wood (41)	1	2	10	polish wth 44
	5001-10.000	non sil.plants (8)	2	25	30	polish wth 46
		cereals (21)	4	19	20	polish wth 47
		dry clay (6)	1	17	20	polish wth 48
		polish '23'	—	—	20	polish wth 63 + 64
		sil.plants (23)	2	9	10	polish wth 49
		soft wood (41)	1	2	10	polish wth 50
	>10.000	polish '23'	—	—	20	polish wth 63 + 64
		sil.plants	—	—	10	polish wth 67
		soil (5)	5	100	10	polish wth 57
Polish topography	**domed**	hard wood (10)	8	80	80	polish topogr 2
		soft wood (41)	25	64	70	polish topogr 3
		sil.plants (23)	15	65	70	polish topogr 4
		ns.plants (8)	2	25	30	polish topogr 5
		cereals (21)	6	29	30	polish topogr 6
		dry antler (2)	2	100	10 *	polish topogr 7
		limestone (1)	1	100	10 *	polish topogr 1
		soaked antler (12)	2	17	10	polish topogr 8
		+ scraping	—	—	40	polish topogr 8
	flat	soil (5)	5	100	100	polish topogr 9
		cereals (21)	11	52	60	polish topogr 10
		non sil.plants (8)	4	50	60	polish topogr 11
		polish '23'	—	—	20	polish topogr 59 + 60
		soaked antler (12)	2	17	10	polish topogr 13

Note: polish resulting from shooting has not been included

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	N	%	PF	RULE
		+ longitudinal	—	—	40	polish topogr 13
		sil.plants (23)	2	9	10	polish topogr 14
		soaked bone (50)	2	4	10	polish topogr 12
		shell	—	—	10	polish topogr 53
		shooting	—	—	10	polish topogr 54
		teeth	—	—	10	polish topogr 55
	corrugated	dry clay (6)	6	100	100	polish topogr 19
		fish scales (6)	1	17	20	polish topogr 16
		sil.plants (23)	1	4	10	polish topogr 15
		soft wood (41)	1	2	10	polish topogr 17
		pottery (2)	2	100	10 *	polish topogr 18
	cratered	hide (24)	15	63	70	polish topogr 20
		polish '23'	—	—	20	polish topogr 61 + 62
	pitted	soaked bone (50)	24	48	50	polish topogr 22
		soaked antler (12)	3	25	30	polish topogr 21
		+ scraping	—	—	40	polish topogr 21
		hide (24)	3	13	20	polish topogr 23
		leather (8)	1	13	20	polish topogr 24
		polish '23'	—	—	20	polish topogr 56 + 57
	comet tails	soaked bone (50)	23	46	50	polish topogr 28
		meat and fish (20)	10	50	50	polish topogr 29
		hard wood (10)	2	20	20	polish topogr 27
		sil.plants (23)	2	9	10	polish topogr 26
	not distinctive	all materials	—	—	—	polish topogr 32 - 52
		polish '23'	—	—	—	polish topogr 58
Striations	**absent**	soil (5)	—	—	xx	striations 1
		dry clay (6)	—	—	xx	striations 2
		soft wood (41)	—	—	20	striations 4
		non sil.plants (8)	—	—	20	striations 9
		stone (1)	—	—	xx	striations 15
	a few	hard wood (10)	—	—	20	striations 3
		soft wood (41)	—	—	20	striations 4
		pottery (2)	—	—	20	striations 7
		fish scales (6)	—	—	20	striations 8
		soaked antler (12)	—	—	20	striations 10
		polish '23' (plant-side)	—	—	20	striations 17
	moderate	pottery (2)	—	—	20	striations 7
		fish scales (6)	—	—	20	striations 8
		hide (24)	—	—	20	striations 13
		cereals (21)	—	—	20	striations 14
		sil. plants	—	—	20	striations 20
		polish '23'	—	—	20	striations 17

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	N	%	PF	RULE
	a lot	shooting (6)	—	—	20	striations 5
		soaked bone (50)	—	—	20	striations 6
		soil (5)	—	—	20	striations 11
		shell (4)	—	—	20	striations 12
		hide (24)	—	—	20	striations 13
		cereals (21)	—	—	20	striations 14
		stone (1)	—	—	20	striations 16
		polish '23'	—	—	20	striations 17
		dry clay (6)	—	—	20	striations 18
Invasiveness	**polish=retouch**	medium hard material	—	—	80	inv 5
	polish>retouch	soft material	—	—	80	inv 4
		medium hard material	—	—	40	inv 3
	polish<retouch	hard material	—	—	80	inv 1
		medium hard material	—	—	40	inv 2

VARIABLE	WEAR FEATURE	MOTION/MATERIAL	SCORE	RULE
Grainsize	**coarse**	non.sil.plants	—	morphology 3 (remark only)
		meat and fish	—	morphology 4 (remark only)
Edge angle	**>90**	longitudinal (polish)	xx	morphology 5
		longitudinal (retouch)	xx	morphology 51
	61-90	transverse (polish)	80	morphology 6
		transverse (retouch)	80	morphology 61
	31-60	—		
	<30	transverse (polish)	—	morphology 7 (remark only)
		transverse (retouch)	—	morphology 71 (remark only)
		hard material	xx	morphology 8
	< 60	perpendicular dynamic (polish)	xx	morphology 30
		perpendicular dynamic (retouch)	xx	morphology 31
Edge shape	**concave**	boring (polish)	xx	morphology 9
		boring (retouch)	xx	morphology 91
		diagonal (polish)	xx	morphology 10
		diagonal (retouch)	xx	morphology 20
		longitudinal (polish)	xx	morphology 11
		longitudinal (retouch)	xx	morphology 21
		perpendicular dynamic (polish)	xx	morphology 12
		perpendicular dynamic (retouch)	xx	morphology 22

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Variable	Wear feature	Motion/Material	Score	Rule
		piercing (polish)	xx	morphology 33
		piercing (retouch)	xx	morphology 32
	convex	boring (polish)	xx	morphology 13
		boring (retouch)	xx	morphology 23
		piercing (polish)	xx	morphology 35
		piercing (retouch)	xx	morphology 34
		diagonal (polish)	xx	morphology 36
		diagonal (retouch)	xx	morphology 37
	straight	boring (polish)	xx	morphology 14
		boring (retouch)	xx	morphology 24
	irregular	transverse (polish)	xx	morphology 15
		transverse (retouch)	xx	morphology 25
		boring (polish)	xx	morphology 16
		boring (retouch)	xx	morphology 26
	pointed	longitudinal (polish)	xx	morphology 17
		longitudinal (retouch)	xx	morphology 27
		perpendicular dynamic (polish)	xx	morphology 18
		perpendicular dynamic (retouch)	xx	morphology 28
		transverse (polish)	xx	morphology 19
		transverse (retouch)	xx	morphology 29

Additional expert knowledge:

Variable	Wear feature	Motion/Material	Score	Rule
Retouch termination	**comminution**	perpendicular dynamic	80	expert knowledge 6
		boring	xx	expert knowledge 61
		piercing	xx	expert knowledge 62
		diagonal	xx	expert knowledge 63
		longitudinal	xx	expert knowledge 64
		transverse	xx	expert knowledge 65
Edge angle & retouch	**C or D & present**	soft material	xx	expert knowledge 8
Retouch length	**very small**	piercing	xx	expert knowledge 18
	small	perpendicular dynamic	xx	expert knowledge 17
Location	**retouch dorsal only & polish ventral only**	transverse	80	expert knowledge 1
		diagonal	40	

Variable	Wear feature	Motion/Material	Score	Rule
	retouch ventral only	transverse	80	expert knowledge 2
	& polish dorsal only	diagonal	40	
rounding & invasiveness	**absent polish < retouch**	cereals	xx	expert knowledge 60
rounding & retouch & striations	**heavy, absent, a lot**	dry clay	40	expert knowledge 5
		hide	40	expert knowledge 51
		soaked bone	xx	expert knowledge 52
		dry antler	xx	expert knowledge 53
		fish scales	xx	expert knowledge 54
		fresh or soaked antler	xx	expert knowledge 55
		meat & fish	xx	expert knowledge 56
		sil. plants	xx	expert knowledge 57
		teeth	xx	expert knowledge 59
rounding & retouch	**heavy, absent**	shooting	xx	expert knowledge 58
	present, absent	perpendicular dynamic	xx	expert knowledge 15
Polish width	**0 - 250**	perpendicular dynamic	xx	expert knowledge 16
Polish texture (side one) & texture (side two)	**rough/matt, rough/matt**	polish '23'	xx	expert knowledge 12
	smooth/matt, smooth/matt	polish '23'	xx	expert knowledge 11

Appendix II

The conceptual knowledge of the hypothesis validation procedure of WAVES

RULE for antler 1
present OF use retouch; step and hinge equal OR step and feather equal OF retouch termination; medium OR large OF retouch width; close distribution OF retouch distribution; isolated spots OR thin line along edge OF polish distribution; class c OR class b OF polish width; very bright OF polish brightness; smooth and matt OF polish texture; domed OR pitted OR flat OF polish topography; retouch exceeds polish OR polish and retouch equal OF invasiveness.

RULE for antler 2
present OF use retouch; step and hinge equal OR step and feather equal OF retouch termination; medium OR large OF retouch width; close distribution OF retouch distribution; melting snow field OR band along the edge OF polish distribution; class c OR class b OF polish width; very bright OF polish brightness; smooth and matt OF polish texture; domed OR pitted OF polish topography; polish and retouch equal OR retouch exceeds polish OF invasiveness.

RULE for antler 3
present OF use retouch; mostly step OF retouch termination; medium OR large OF retouch width; close distribution OF retouch distribution; absent OF edge rounding; isolated spots OR thin line along edge OF polish distribution; class d OF polish width; bright OF polish brightness; rough and matt OF polish texture; domed OR flat OF polish topography; retouch exceeds polish OF invasiveness.

RULE for antler 4
absent OF use retouch; obtuse OF edge angle; absent OR slight OF edge rounding; isolated spots OR thin line along edge OF polish distribution; class d OF polish width; bright OF polish brightness; rough and matt OF polish texture; domed OR flat OF polish topography.

RULE for bone 1
present OF use retouch; step and hinge equal OR step and feather equal OF retouch termination; medium OR large OF retouch width; close distribution OR clumped distribution OF retouch distribution;
isolated spots OR thin line along edge OR band along the edge OR spread OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OR rough and matt OF polish texture; comet tails OR pitted OR flat OF polish topography; retouch exceeds polish OR polish and retouch equal OF invasiveness.

RULE for bone 2
present OF use retouch; step and hinge equal OR step and feather equal OF retouch termination; medium OR large OF retouch width; close distribution OR clumped distribution OF retouch distribution;
bevel OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OF polish texture; perpendicular OF polish directionality; retouch exceeds polish OR polish and retouch equal OF invasiveness.

RULE for bone 3
absent OF use retouch; obtuse OF edge angle; isolated spots OR thin line along edge OR band along the edge OR spread OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OR rough and matt OF polish texture; comet tails OR pitted OR flat OF polish topography.

RULE for bone 4
absent OF use retouch; obtuse OF edge angle; bevel OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OF polish texture; perpendicular OF polish directionality.

RULE for cereals 1
present OF use retouch; mostly feather OF retouch termination; small OF retouch width; uneven distribution OF retouch distribution; heavy OR slight OF edge rounding; band along the edge OR spread OF polish distribution; class e OR class f OF polish width; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OR flat OF polish topography; polish exceeds retouch OF invasiveness.

RULE for cereals 2
absent OF use retouch; heavy OR slight OF edge rounding; band along the edge OR spread OF polish distribution; class e OR class f OF polish width; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OR flat OF polish topography.

RULE for dry clay 1
heavy OF edge rounding; spread OR band along the edge OF polish distribution; class e OR class f OF polish width; very bright OF polish brightness; rough and matt OF polish texture; corrugated OF polish topography; many OF striations.

RULE for fish scales 1
present OF use retouch; mostly feather OF retouch termination; small OR very small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; band away from the edge OR band along the edge OF polish distribution; class d OR class b OF polish width; bright OF polish brightness; rough and greasy OF polish texture; polish and retouch equal OR retouch exceeds polish OF invasiveness.

RULE for fish scales 2
present OF use retouch; mostly feather OF retouch termination; small OR very small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; isolated spots OR thin line along edge OF polish distribution; class d OF polish width; bright OF polish brightness; smooth and matt OF polish texture; comet tails OF polish topography; polish and retouch equal OR retouch exceeds polish OF invasiveness.

RULE for fish scales 3
present OF use retouch; mostly feather OF retouch termination; small OR very small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; streaks OF polish distribution; class d OR class b OF polish width; dull OF polish brightness; rough and matt OF polish texture; corrugated OF polish topography; polish and retouch equal OR retouch exceeds polish OF invasiveness.

RULE for fish scales 4
absent OF use retouch; band away from the edge OR band along the edge OF polish distribution; class d OR class b OF polish width; bright OF polish brightness; rough and greasy OF polish texture.

RULE for fish scales 5
absent OF use retouch; isolated spots OR thin line along edge OF polish distribution; class d OF polish width; bright OF polish brightness; smooth and matt OF polish texture; comet tails OF polish topography; polish and retouch equal OF invasiveness.

RULE for fish scales 6
absent OF use retouch; streaks OF polish distribution; class d OF polish width;OR class b OF polish width; dull OF polish brightness; rough and matt OF polish texture; corrugated OF polish topography.

RULE for hard animal material 1
present OF use retouch; step and feather equal OR mostly step OF retouch termination; large OR medium OF retouch width; close distribution OF retouch distribution; isolated spots OR streaks OF polish distribution; very bright OF polish brightness; retouch exceeds polish OF invasiveness.

RULE for hard animal material 2
absent OF use retouch; obtuse OF edge angle; isolated spots OR streaks OF polish distribution; very bright OF polish brightness.

RULE for hard inorganic material 1
present OF use retouch; mostly step OF retouch termination; large OF retouch width; close distribution OF retouch distribution; isolated spots OR streaks OF polish distribution; bright OF polish brightness; many OF striations; retouch exceeds polish OF invasiveness.

RULE for hard inorganic material 2
absent OF use retouch; obtuse OF edge angle; isolated spots OR streaks OF polish distribution; bright OF polish brightness; many OF striations.

RULE for hard vegetal material 1
present OF use retouch; step and hinge equal OF retouch termination; medium OR large OF retouch width; close distribution OF retouch distribution; slight OF edge rounding; isolated spots OR thin line along edge OF polish distribution; very bright OF polish brightness; retouch exceeds polish OF invasiveness.

RULE for hard vegetal material 2
absent OF use retouch; obtuse OF edge angle; slight OF edge rounding; isolated spots OR thin line along edge OF polish distribution; very bright OF polish brightness.

RULE for hard wood 1
present OF use retouch; hinge and feather equal OF retouch termination; medium OR large OF retouch width; slight OF edge rounding; reticulated OR isolated spots OR thin line along edge OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OR comet tails OF polish topography; many OF striations; retouch exceeds polish OF invasiveness.

RULE for hard wood 2
absent OF use retouch; obtuse OF edge angle; slight OF edge rounding; reticulated OR isolated spots OR thin line along edge OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OF polish topography; many OF striations.

RULE for hide 1
slight OR absent OF edge rounding; band along the edge OR thin line along edge OF polish distribution; bright OR dull OF polish brightness; rough and greasy OR rough and matt OF polish texture; cratered OR pitted OF polish topography.

RULE for hide 2
heavy OF edge rounding; band along the edge OR spread OF polish distribution; bright OR dull OF polish brightness; rough and greasy OR rough and matt OF polish texture; cratered OR pitted OF polish topography; many OF striations.

RULE for leather 1
present OF use retouch; very small OR small OF retouch width; thin line along edge OR isolated spots OR streaks OF polish distribution; bright OR dull OF polish brightness; rough and greasy OR rough and matt OF polish texture.

RULE for leather 2
absent OF use retouch; slight OF edge rounding; thin line along edge OR isolated spots OR streaks OF polish distribution; bright OR dull OF polish brightness; rough and greasy OR rough and matt OF polish texture.

RULE for limestone 1
heavy OF edge rounding; absent OF polish.

RULE for limestone 2
present OF use retouch; hinge and feather equal OF retouch termination; medium OR large OF retouch width; absent OF edge rounding; isolated spot OR streaks OF polish distribution; class d OR class b OF polish width; bright OF polish brightness; smooth and matt OF polish texture; many OF striations.

RULE for meat and fish 1
present OF use retouch; mostly feather OF retouch termination; very small OR small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; greasy lustre OF polish distribution; dull with bright spots OF polish brightness; rough and greasy OF polish texture.

RULE for meat and fish 2
absent OF use retouch; greasy lustre OF polish distribution; dull with bright spots OF polish brightness; rough and greasy OF polish texture.

RULE for medium animal material 1
present OF use retouch; mostly feather OF retouch termination; small OF retouch width; slight OR absent OF edge rounding; band along the edge OR spread OF polish distribution; dull OF polish brightness; polish and retouch equal OR polish exceed retouch OF invasiveness.

RULE for medium inorganic material 1
heavy OF edge rounding; spread OR band along the edge OF polish distribution; very bright OF polish brightness; many OF striations.

RULE for medium vegetal material 1
present OF use retouch; hinge and feather equal OF retouch termination; medium OR large OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; slight OF edge rounding; spread OR band along the edge OF polish distribution; very bright OF polish brightness; polish and retouch equal OR polish exceed retouch OF invasiveness.

RULE for non siliceous plants 1
present OF use retouch; mostly feather OF retouch termination; small OR very small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; band along the edge OR thin line along edge OR streaks OF polish distribution; class e OR class f OF polish width; very bright OR bright OR dull OF polish brightness; smooth and matt OF polish texture; domed OR flat OF polish topography; polish exceed retouch OF invasiveness.

RULE for non siliceous plants 2
absent OF use retouch; band along the edge OR spread OR thin line along edge OR streaks OF polish distribution; class e OR class f OF polish width; very bright OR bright OR dull OF polish brightness; smooth and matt OF polish texture; domed OR flat OF polish topography.

RULE for polish '10' 1
heavy OR slight OF edge rounding; band along the edge OR spread OF polish distribution; class e OR class f OF polish width; dull with bright spots OF polish brightness; rough and greasy OF polish texture; cratered and flat OF polish topography; many OF striations.

RULE for polish '23' 1
heavy OF edge rounding; different OF polish character; band along the edge OR spread OF polish distribution; class e OR class f OF polish width; perpendicular OF polish directionality; plant like OF polish character; hide like OF polish character; many OF striations.

RULE for pottery 1
absent OF use retouch; slight OF edge rounding; isolated spots OR streaks OF polish distribution; bright OF polish brightness; rough and matt OF polish texture; corrugated OF polish topography.

RULE for shell 1
present OF use retouch; medium OF retouch width; step and hinge equal OF retouch termination; isolated spots OR streaks OF polish distribution; class a OF polish width; bright OF polish brightness; rough and matt OF polish texture; retouch exceeds polish OF invasiveness.

RULE for shell 2
absent OF use retouch; obtuse OF edge angle; slight OF edge rounding; isolated spots OR streaks OF polish distribution; class a OF polish width; bright OF polish brightness; rough and matt OF polish texture.

RULE for shooting 1
large impact scars OF retouch width OR snaps OF retouch termination; streaks OF polish distribution; bright OR very bright OF polish brightness; rough and matt OF polish texture.

RULE for siliceous plants 1
present OF use retouch; mostly feather OF retouch termination; small OR very small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; band along the edge OR spread OR thin line along edge OR streaks OF polish distribution; class e OR class f OF polish width; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OR flat OR comet tails OF polish topography; polish exceed retouch OF invasiveness.

RULE for siliceous plants 2
absent OF use retouch; band along the edge OR spread OR thin line along edge OR streaks OF polish distribution; class e OR class f OF polish width; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OR flat OR comet tails OF polish topography.

RULE for soft animal material 1
present OF use retouch; mostly feather OF retouch termination; very small OR small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; band along the edge OR spread OF polish distribution; dull OF polish brightness; polish exceed retouch OF invasiveness.

RULE for soft animal material 2
absent OF use retouch; band along the edge OR spread OF polish distribution; dull OF polish brightness; polish exceed retouch OF invasiveness.

RULE for soft vegetal material 1
present OF use retouch; mostly feather OF retouch termination; small OR very small OF retouch width; uneven distribution OR clumped distribution OF retouch distribution; absent OF edge rounding; band along the edge OR spread OF polish distribution; very bright OF polish brightness; polish exceed retouch OF invasiveness.

RULE for soft vegetal material 2
absent OF use retouch; absent OR slight OF edge rounding; band along the edge OR spread OF polish distribution; very bright OF polish brightness.

RULE for soft wood 1
present OF use retouch; hinge and feather equal OF retouch termination; small OR medium OF retouch width; slight OR absent OF edge rounding; reticulated OR spread OR band along the edge OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OF polish topography.

RULE for soft wood 2
absent OF use retouch; slight OF edge rounding; reticulated OR spread OR band along the edge OF polish distribution; very bright OR bright OF polish brightness; smooth and matt OF polish texture; domed OF polish topography.

RULE for soil 1
heavy OF edge rounding; spread OF polish distribution; class e OR class f OF polish width; very bright OF polish brightness; rough and matt OF polish texture; flat OF polish topography; many OF striations.

Appendix III
The input and output variables of WARP

Input neurons:

Distribution A = scintillation
Distribution B = on protruding points
Distribution C = reticulated
Distribution D = isolated spots
Distribution E = thin line along the edge
Distribution F = band along the edge
Distribution G = spread
Distribution H = streaks
Distribution I = isolated spots & streaks
Texture A = smooth & matt
Texture B = rough & greasy
Texture C = rough & matt
Brightness A = very bright
Brightness B = bright
Brightness C = dull
Topography A = domed
Topography B = flat
Topography C = corrugated
Topography D = cratered
Topography E = pitted
Topography F = bevel
Topography G = comet tails
Topography H = pitted & comet tails
Width A = 0-250 micron
Width B = 251-500 micron
Width C = 501-750 micron
Width D = 751-1000 micron
Width E = 1001-2000 micron
Width F = 2001-5000 micron
Width G = 5001-10.000 micron
Width H = > 10.000 micron

Output neurons:

Material 1   = dry hide
Material 2   = fresh hide
Material 3   = hard wood
Material 4   = soft wood
Material 5   = dry bone
Material 6   = soaked bone
Material 7   = dry antler
Material 8   = soaked antler
Material 9   = cereals
Material 10 = butchering meat and fish
Material 11 = pottery
Material 12 = stone
Material 13 = soil
Material 14 = siliceous plants
Material 15 = non-siliceous plants

Appendix IV
Descriptions of the blind test

experiment 1 cutting roots (20 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial equal, not alternating	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more
RETOUCH DISTRIBUTION	close	uneven	close	uneven	uneven
RETOUCH ORIENTATION	even mix	perpendicular	even mix	even mix	even mix
RETOUCH TERMINATION	feather & hinge equal	mostly feather	mostly feather	mostly step	mostly feather
RETOUCH WIDTH	very small	very small	very small	very small	small
EDGE ROUNDING	slight	slight	slight	slight	slight
INVASIVENESS	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch
POLISH LOCATION	bifacial equal	bifacial, dorsal more	bifacial, ventral more	bifacial, ventral more	bifacial, dorsal more
POLISH DIRECTIONALITY	parallel	parallel	absent	perpendicular	absent
POLISH DISTRIBUTION	spread	band away from the edge	melting snow field	spread	reticulated
POLISH TEXTURE	smooth & matt	smooth & matt	rough & greasy	smooth & matt	smooth & matt
POLISH BRIGHTNESS	very bright	very bright	bright	bright	bright
POLISH TOPOGRAPHY	flat	domed/pitted	flat/cratered	not distinctive	domed
POLISH WIDTH	class g	class g	class d	class f	class g
STRIATIONS	absent	absent	absent	absent	absent
GRAINSIZE	medium	medium	medium	fine	medium
EDGE ANGLE	class b	class b	class b	class b	class a
EDGE SHAPE	straight	convex	convex	straight	straight

experiment 2 butchering (15 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more	bifacial equal, not alternating	bifacial, alternating
RETOUCH DISTRIBUTION	close	uneven	overlapping	uneven	multi-generation
RETOUCH ORIENTATION	even mix	perpendicular	perpendicular	even mix	even mix
RETOUCH TERMINATION	mostly step	mostly hinge	mostly feather	mostly step	mostly feather
RETOUCH WIDTH	very small	very small	very small	very small	medium
EDGE ROUNDING	slight	absent	absent	absent	slight
INVASIVENESS	retouch exceeds polish	polish equals retouch	retouch exceeds polish	polish exceeds retouch	retouch exceeds polish
POLISH LOCATION	bifacial equal	bifacial equal	bifacial equal	bifacial, dorsal more	bifacial equal
POLISH DIRECTIONALITY	random	parallel	absent	parallel	parallel
POLISH DISTRIBUTION	greasy lustre	isolated spots	isolated spots	greasy lustre	isolated spots
POLISH TEXTURE	rough & greasy	smooth & matt	rough & greasy	rough & matt	rough & matt
POLISH BRIGHTNESS	dull	bright	dull	dull	dull
POLISH TOPOGRAPHY	not distinctive	domed	not distinctive	corrugated/not distinctive	not distinctive
POLISH WIDTH	class b	class a	class a	class b	class c
STRIATIONS	absent	a few	absent	absent	a few
GRAINSIZE	medium	medium	medium	medium	fine
EDGE ANGLE	class b	class b	class b	class b	class a
EDGE SHAPE	straight	straight	concave	straight	straight

experiment 3 scraping antler (15 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	—	—	dorsal only	—
RETOUCH DISTRIBUTION	—	—	—	multi generation	—
RETOUCH ORIENTATION	—	—	—	even mix	—
RETOUCH TERMINATION	—	—	—	mostly feather	—
RETOUCH WIDTH	—	—	—	class c	—
EDGE ROUNDING	slight	slight	slight	absent	slight
INVASIVENESS	—	—	—	polish exceeds retouch	—
POLISH LOCATION	bifacial, ventral more	bifacial, dorsal more	ventral only	bifacial, ventral more	ventral only
POLISH DIRECTIONALITY	perpendicular	perpendicular	perpendicular	absent	perpendicular
POLISH DISTRIBUTION	isolated spots	thin line along the edge	thin line along the edge	greasy lustre	band along the edge
POLISH TEXTURE	smooth & matt	smooth & matt	rough & greasy	rough & greasy	smooth & matt
POLISH BRIGHTNESS	very bright	bright	bright	bright	bright
POLISH TOPOGRAPHY	not distinctive	domed	domed/flat	cratered/pitted	domed
POLISH WIDTH	class a	class b	class a	class c	class b
STRIATIONS	absent	moderate	absent	absent	a few
GRAINSIZE	medium	medium	medium	fine	medium
EDGE ANGLE	class c	class c	class c	class c	class c
EDGE SHAPE	convex	convex	convex	convex	convex

experiment 4 carving bone (26 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial, alternating	bifacial, not alternating	bifacial, not alternating	bifacial, dorsal more	bifacial, dorsal more
RETOUCH DISTRIBUTION	uneven	close	close	uneven	uneven
RETOUCH ORIENTATION	diagonal	diagonal	even mix	perpendicular	perpendicular
RETOUCH TERMINATION	mostly hinge	mostly step	snaps	mostly feather	mostly feather
RETOUCH WIDTH	small	very small	very small	very small	very small
EDGE ROUNDING	slight	absent	absent	absent	slight
INVASIVENESS	polish exceeds retouch	polish exceeds retouch	retouch exceeds polish	retouch exceeds polish	polish exceeds retouch
POLISH LOCATION	bifacial equal	bifacial equal	bifacial equal	bifacial equal	bifacial, ventral more
POLISH DIRECTIONALITY	parallel	parallel	absent	parallel	parallel
POLISH DISTRIBUTION	band along the edge	thin line along the edge	isolated spots	greasy lustre	greasy lustre
POLISH TEXTURE	smooth & matt	smooth & matt	rough & greasy	smooth & matt	rough & greasy
POLISH BRIGHTNESS	very bright	bright	dull	bright	dull
POLISH TOPOGRAPHY	pitted/comet tails	domed	not distinctive	pitted/domed	cratered
POLISH WIDTH	class d	class a	class a	class b	class d
STRIATIONS	absent	a few	absent	absent	a few
GRAINSIZE	medium	medium	medium	fine	fine
EDGE ANGLE	class b	class b	class a	class a	class a
EDGE SHAPE	straight	straight	straight	straight	straight

experiment 5 reaping cereals (30 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	bifacial equal	ventral only	bifacial, dorsal more	bifacial, dorsal more
RETOUCH DISTRIBUTION	—	close	uneven	uneven	close
RETOUCH ORIENTATION	—	diagonal	perpendicular	even mix	even mix
RETOUCH TERMINATION	—	mostly feather	mostly feaher	mostly feather	mostly feather
RETOUCH WIDTH	—	very small	very small	very small	very small
EDGE ROUNDING	slight	slight	heavy	slight	slight
INVASIVENESS	—	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch
POLISH LOCATION	bifacial equal	bifacial, ventral more	bifacial, ventral more	bifacial, ventral more	bifacial, ventral more
POLISH DIRECTIONALITY	parallel	parallel	parallel	diagonal	parallel
POLISH DISTRIBUTION	spread	spread	spread	band along the edge	reticulated
POLISH TEXTURE	smooth & matt	smooth & matt	smooth & matt	smooth & matt	smooth & matt
POLISH BRIGHTNESS	very bright	very bright	bright	bright	very bright
POLISH TOPOGRAPHY	flat	domed/flat	flat	domed/not distinctive	domed / pitted
POLISH WIDTH	class f	class a	class e	class d	class e
STRIATIONS	a lot	absent	a few	a few	a few
GRAINSIZE	medium	fine	fine	fine	fine
EDGE ANGLE	class b	class a	class b	class a	class b
EDGE SHAPE	straight	straight	straight	straight	straight

experiment 6 cutting grass (30 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial, alternating	bifacial, ventral more	bifacial, ventral more	bifacial, alternating	bifacial, ventral more
RETOUCH DISTRIBUTION	uneven	uneven	uneven	uneven	uneven
RETOUCH ORIENTATION	diagonal	perpendicular	perpendicular	even mix	even mix
RETOUCH TERMINATION	mostly feather	mostly feather	mostly feather	mostly feather	mostly feather
RETOUCH WIDTH	very small	very small	very small	very small	very small
EDGE ROUNDING	slight	heavy	heavy	heavy	slight
INVASIVENES	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch
POLISH LOCATION	bifacial equal	bifacial, dorsal more	bifacial equal	bifacial equal	bifacial equal
POLISH DIRECTIONALITY	parallel	parallel	absent	parallel	parallel
POLISH DISTRIBUTION	band along the edge	band along the edge	band along the edge	band along the edge	reticulated
POLISH TEXTURE	smooth & matt	smooth & matt	rough & matt	smooth & matt	smooth & matt
POLISH BRIGHTNESS	very bright	very bright	bright	bright	very bright
POLISH TOPOGRAPHY	domed	domed	flat/domed	flat/pitted	domed/pitted
POLISH WIDTH	class b	class d	class a	class b	class d
STRIATIONS	absent	absent	absent	absent	a few
GRAINSIZE	medium	fine	fine	fine	fine
EDGE ANGLE	class b	class b	class b	class b	class b
EDGE SHAPE	convex	straight	convex	straight	straight

experiment 7 scraping hide (60 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	—	—	bifacial, dorsal more	ventral only
RETOUCH DISTRIBUTION	—	—	—	uneven	uneven
RETOUCH ORIENTATION	—	—	—	perpendicular	perpendicular
RETOUCH TERMINATION	—	—	—	mostly feather	mostly step
RETOUCH WIDTH	—	—	—	very small	small
EDGE ROUNDING	slight	slight	slight	slight	slight
INVASIVENESS	—	—	—	polish exceeds retouch	polish exceeds retouch
POLISH LOCATION	bifacial equal	bifacial equal	ventral only	bifacial, ventral more	ventral only
POLISH DIRECTIONALITY	absent	perpendicular	absent	perpendicular	absent
POLISH DISTRIBUTION	thin line along the edge	reticulated	band along the edge	band away from the edge	band away from the edge
POLISH TEXTURE	rough & greasy	rough & greasy	rough & greasy	rough & greasy	rough & greasy
POLISH BRIGHTNESS	bright	bright	bright	bright	bright
POLISH TOPOGRAPHY	cratered	cratered	cratered	not distinctive	cratered/not distinctive
POLISH WIDTH	class a	class d	class a	class b	class e
STRIATIONS	absent	a few	absent	absent	absent
GRAINSIZE	medium	fine	fine	fine	fine
EDGE ANGLE	class c	class b	class c	class b	class c
EDGE SHAPE	convex	convex	convex	convex	convex

experiment 8 scraping hide (60 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	—	—	bifacial, dorsal more	—
RETOUCH DISTRIBUTION	—	—	—	close	—
RETOUCH ORIENTATION	—	—	—	perpendicular	—
RETOUCH TERMINATION	—	—	—	mostly feather	—
RETOUCH WIDTH	—	—	—	very small	—
EDGE ROUNDING	heavy	heavy	heavy	slight	heavy
INVASIVENESS	—	—	—	retouch exceeds polish	—
POLISH LOCATION	ventral only	bifacial equal	ventral only	bifacial, ventral more	bifacial equal
POLISH DIRECTIONALITY	perpendicular	perpendicular	absent	perpendicular	perpendicular
POLISH DISTRIBUTION	band along the edge	band along the edge	band along the edge	thin line along the edge	bevel ?
POLISH TEXTURE	rough & greasy	rough & greasy	rough & greasy	smooth & matt	rough & greasy
POLISH BRIGHTNESS	dull	bright	bright	bright	bright
POLISH TOPOGRAPHY	cratered	cratered	cratered/pitted	pitted/not distinctive	cratered
POLISH WIDTH	class a	class c	class a	class a	class b
STRIATIONS	absent	moderate	absent	a few	a few
GRAINSIZE	medium	fine	fine	fine	fine
EDGE ANGLE	class c	class c	class c	class b	class c
EDGE SHAPE	convex	convex	convex	convex	convex

experiment 9 butchering fish (35 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more	bifacial equal, not alternating	bifacial, dorsal more
RETOUCH DISTRIBUTION	uneven	uneven	close	close	close
RETOUCH ORIENTATION	diagonal	even mix	perpendicular	even mix	even mix
RETOUCH TERMINATION	mostly hinge	mostly feather	snaps	mostly feather	mostly feather
RETOUCH WIDTH	very small	very small	very small	very small	very small
EDGE ROUNDING	slight	absent	slight	slight	slight
INVASIVENESS	retouch exceeds polish	polish exceeds retouch	retouch exceeds polish	retouch exceeds polish	retouch exceeds polish
POLISH LOCATION	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more	bifacial, dorsal more
POLISH DIRECTIONALITY	parallel	parallel	parallel	parallel	absent
POLISH DISTRIBUTION	isolated spots	greasy lustre	thin line along the edge	thin line along the edge	thin line along the edge
POLISH TEXTURE	rough & matt	rough & greasy	rough & greasy	smooth & matt	rough & greasy
POLISH BRIGHTNESS	bright	bright	bright	bright	dull
POLISH TOPOGRAPHY	comet tails	corrugated	flat/domed	domed/pitted	not distinctive
POLISH WIDTH	class a	class a	class a	class a	class a
STRIATIONS	absent	a few	absent	absent	absent
GRAINSIZE	medium	fine	fine	fine	fine
EDGE ANGLE	class a	class a	class a	class a	class a
EDGE SHAPE	straight	straight	convex	straight	straight

experiment 10 splitting wood (20 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	dorsal only	—	ventral only	bifacial, ventral more	one facet of a point
RETOUCH DISTRIBUTION	single break	—	uneven	uneven	clumped
RETOUCH ORIENTATION	perpendicular	—	perpendicular	perpendicular	perpendicular
RETOUCH TERMINATION	mostly step	—	mostly feather	mostly feather	mostly step
RETOUCH WIDTH	very small	—	very small	very small	very small
EDGE ROUNDING	slight	absent	slight	slight	slight
INVASIVENESS	retouch equals polish	—	retouch exceeds polish	retouch equals polish	retouch exceeds polish
POLISH LOCATION	multiple facets of a point	multiple facets of a point	ventral only	multiple facets of a point	one facet of a point
POLISH DIRECTIONALITY	parallel	diagonal	absent	random	absent
POLISH DISTRIBUTION	thin line along the edge	reticulated	isolated spots	thin line along the edge	band along the edge
POLISH TEXTURE	smooth & matt	rough & matt	smooth & matt	smooth & matt	smooth & matt
POLISH BRIGHTNESS	very bright	bright	very bright	bright	very bright
POLISH TOPOGRAPHY	domed/pitted	domed	flat/domed	pitted	domed
POLISH WIDTH	class a	class b	class a	class a	class a
STRIATIONS	absent	a few	absent	absent	absent
GRAINSIZE	medium	coarse	coarse	coarse	medium
EDGE ANGLE	class b	class c	class c	class c	class c
EDGE SHAPE	pointed	pointed	pointed	pointed	pointed

experiment 11 scraping hide (115 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial equal, alternating	bifacial, ventral more	—	ventral only	ventral only
RETOUCH DISTRIBUTION	overlapping	overlapping	—	uneven	close
RETOUCH ORIENTATION	perpendicular	even mix	—	perpendicular	perpendicular
RETOUCH TERMINATION	mostly feather	feather & hinge equal	—	mostly feather	mostly feather
RETOUCH WIDTH	small	small		very small	small
EDGE ROUNDING	heavy	heavy	heavy	slight	heavy
INVASIVENESS	polish exceeds retouch	polish exceeds retouch	—	polish exceeds retouch	retouch exceeds polish
POLISH LOCATION	bifacial equal	bifacial, dorsal more	bifacial, ventral more	ventral only	bifacial, ventral more
POLISH DIRECTIONALITY	perpendicular	perpendicular	absent	perpendicular	perpendicular
POLISH DISTRIBUTION	band along the edge	band along the edge	band along the edge	band along the edge	band along the edge
POLISH TEXTURE	rough & greasy	rough & greasy	rough & greay	smooth & matt	rough & greasy
POLISH BRIGHTNESS	bright	bright	bright	bright	bright
POLISH TOPOGRAPHY	cratered	cratered	cratered	domed/not distinctive	cratered
POLISH WIDTH	class a	class e	class b	class c	class b
STRIATIONS	moderate	moderate	absent	absent	a few
GRAINSIZE	medium		medium	medium	medium
EDGE ANGLE	class c	class c	class c	class b	class c
EDGE SHAPE	convex	convex	convex	convex	convex

experiment 12 carving dry clay (20 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	—	one facet of a point	multiple facets of a point	—
RETOUCH DISTRIBUTION	—	—	overlapping	uneven	—
RETOUCH ORIENTATION	—	—	perpendicular	perpendicular	—
RETOUCH TERMINATION	—	—	mostly feather	mostly feather	—
RETOUCH WIDTH	—	—	small	very small	—
EDGE ROUNDING	heavy	heavy	slight	absent	heavy
INVASIVENESS	—	—	retouch exceeds polish	polish exceeds retouch	—
POLISH LOCATION	one facet of a point	multiple facets of a point	multiple facets of a point	multiple facets of a point	one facet of a point
POLISH DIRECTIONALITY	parallel	diagonal	diagonal	absent	parallel
POLISH DISTRIBUTION	band along the edge	spots & streaks	spots & streaks	thin line along the edge	band along the edge
POLISH TEXTURE	rough & matt	smooth & matt	rough & greasy	smooth & matt	rough & greasy
POLISH BRIGHTNESS	very bright	bright	bright	bright	bright
POLISH TOPOGRAPHY	not distinctive/flat	cratered	flat/domed	comet tails/not distinctive	cratered/not distinctive
POLISH WIDTH	class b	class e	class a	class a	class e
STRIATIONS	a lot	moderate	a few	absent	a lot
GRAINSIZE	medium	medium	medium	medium	fine
EDGE ANGLE	class c	class c	class c	class c	class c
EDGE SHAPE	pointed	pointed	pointed	pointed	pointed

experiment 13 scraping wood (20 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	bifacial, dorsal more	bifacial, ventral more	bifacial equal, not alternating	bifacial equal, not alternating	bifacial, ventral more
RETOUCH DISTRIBUTION	uneven	close	overlapping	uneven	clumped
RETOUCH ORIENTATION	diagonal	perpendicular	perpendicular	even mix	perpendicular
RETOUCH TERMINATION	feather & step equal	mostly feather	mostly feather	mostly feather	snaps (& feather)
RETOUCH WIDTH	small	small	very small	very small	very small
EDGE ROUNDING	absent	absent	slight	slight	slight
INVASIVENESS	retouch equals polish	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch	polish exceeds retouch
POLISH LOCATION	bifacial, dorsal more	bifacial, dorsal more	bifacial equal	bifacial equal	bifacial equal
POLISH DIRECTIONALITY	absent	diagonal	parallel	parallel	absent
POLISH DISTRIBUTION	thin line along the edge	band along the edge	band along the edge	band along the edge	greasy lustre
POLISH TEXTURE	smooth & matt	rough & greasy	rough & matt	smooth & matt	rough & greasy
POLISH BRIGHTNESS	bright	bright	dull	bright	dull
POLISH TOPOGRAPHY	domed	corrugated	domed/cratered	not distinctive	not distinctive
POLISH WIDTH	class a	class a	class b	class b	class a
STRIATIONS	absent	absent	absent	absent	absent
GRAINSIZE	medium	medium	medium	medium	fine
EDGE ANGLE	class b	class b	class a	class b	class b
EDGE SHAPE	straight	straight	straight	straight	straight

experiment 14 carving bone (45 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	multiple facets of a point	—	ventral only	bifacial equal, not alternating
RETOUCH DISTRIBUTION	—	multi generation	—	uneven	multi-generation
RETOUCH ORIENTATION	—	even mix	—	perpendicular	perpendicular
RETOUCH TERMINATION	—	comminution	—	feather & step equal	mostly step
RETOUCH WIDTH	—	large	—	very small	small
EDGE ROUNDING	slight	slight	heavy	slight	slight
INVASIVENESS	—	retouch exceeds polish	—	retouch exceeds polish	retouch exceeds polish
POLISH LOCATION	one facet of a point	multiple facets of a point	bifacial equal	ventral only	one facet of a point
POLISH DIRECTIONALITY	perpendicular	perpendicular	perpendicular	perpendicular	perpendicular
POLISH DISTRIBUTION	thin line along the edge	bevel	bevel	thin line along the edge	band along the edge
POLISH TEXTURE	smooth & matt	smooth & matt	smooth & matt	smooth & matt	rough & matt
POLISH BRIGHTNESS	very bright	bright	bright	very bright	bright
POLISH TOPOGRAPHY	flat/comet tails	domed	flat	comet tails	domed/comet tails
POLISH WIDTH	class a	class a	class a	class a	class a
STRIATIONS	absent	moderate	a few	moderate	a few
GRAINSIZE	medium	medium	medium	medium	fine
EDGE ANGLE	class b	class d	class c	class c	class c
EDGE SHAPE	pointed	pointed	pointed	pointed	pointed

experiment 15 sawing shell (10 min.)	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH LOCATION	—	—	ventral only	ventral only	bifacial, ventral more
RETOUCH DISTRIBUTION	—	—	overlapping	close	uneven
RETOUCH ORIENTATION	—	—	even mix	even mix	diagonal
RETOUCH TERMINATION	—	—	mostly feather	mostly feather	comminution
RETOUCH WIDTH	—		small	very small	very small
EDGE ROUNDING	absent	slight	absent	absent	slight
INVASIVENESS	—	—	retouch exceeds polish	polish exceeds retouch	retouch exceeds polish
POLISH LOCATION	bifacial equal	bifacial, dorsal more	bifacial equal	bifacial, ventral more	bifacial, ventral more
POLISH DIRECTIONALITY	absent	parallel	parallel	absent	absent
POLISH DISTRIBUTION	thin line along the edge	isolated spots	isolated spots	isolated spots	band along the edge
POLISH TEXTURE	smooth & matt	smooth & matt	rough & matt	smooth & matt	rough & greasy
POLISH BRIGHTNESS	bright	bright	dull	very bright	bright
POLISH TOPOGRAPHY	flat/corrugated	domed	domed/pitted	flat/not distinctive	not distinctive
POLISH WIDTH	class a	class a	class a	class d	class a
STRIATIONS	absent	a few	a few	absent	absent
GRAINSIZE	medium	coarse	medium	medium	medium
EDGE ANGLE	class b	class b	class b	class b	class b
EDGE SHAPE	straight	straight	convex	straight	straight

Appendix V
Interpretations of the blind test

experiment 1 cutting roots (20 min.)		control set		analyst I		analyst II		analyst III		analyst IV	
MATERIAL	RETOUCH	medium	200	soft	200	medium	200	medium	100	soft	180
		soft	180	medium	160	soft	200			medium	160
	POLISH	cereals	250	—		—		non silic. plants	150	soft wood	160
		non silic. plants	220					cereals	110		
		silicious plants	140					silicious plants	80		
								soft wood	70		
MOTION	RETOUCH	longitudinal	140	transverse	160	longitudinal	80	longitudinal	100	longitudinal	100
		diagonal	80			diagonal	60	carving	60	carving	60
	POLISH	longitudinal	100	longitudinal	180	transverse	100	longitudinal	100	transverse	60
		diagonal	60			longitudinal	20	carving	60	longitudinal	40
										carving	20
										piercing	20
INTERPRETATION ANALYST		—		sawing hard wood		sawing antler		—		silicious plants longitudinal	

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experiment 2
butchering deer (15 min.)

MATERIAL		control set	analyst I	analyst II	analyst III	analyst IV
	RETOUCH	medium 140	medium 160 soft 100	soft 140 medium 120	soft 100 medium 120	medium 180 soft 60
	POLISH	leather 110 meat or fish 80 hide 70	hard wood 270 soft wood 190 soaked antler 170 silicious plants 130 cereals 70 dry antler 40 stone 40	leather 150 meat or fish 130 hide 120	leather 80 soft wood 80 meat or fish 70 hide 50 bone 30 soaked antler 30	bone 100 meat or fish 60 soft wood 60 hide 50
MOTION	RETOUCH	longitudinal 80 carving 60	transverse 160	transverse 140	longitudinal 160 carving 80	—
	POLISH	longitudinal 100 carving 60 piercing 60	longitudinal 100 carving 60	transverse 20	longitudinal 100 carving 40	longitudinal 100 carving 60
INTERPRETATION ANALYST		—	—	bone transverse	—	wood or butchering with bone contact longitudinal

experiment 3
scraping antler (15 min.)

MATERIAL		control set		analyst I		analyst II		analyst III		analyst IV	
	RETOUCH	medium	60	medium	60	medium	60	medium	160	medium	60
		soft	40	soft	40	soft	40			soft	40
	POLISH	bone	210	hard wood	200	soaked antler	120	hide	170	hard wood	190
		soaked antler	180	soft wood	160					soft wood	170
				silicious plants	160					silicious plants	150
				soaked antler	110					soaked antler	110
				non silic. plants	80					cereals	90
				dry antler	40						
				stone	40						
MOTION	RETOUCH	no indications		no indications		no indications		longitudinal	40	no indications	
								carving	20		
	POLISH	transverse	200	transverse	220	transverse	240	transverse	140	transverse	240
		carving	40					longitudinal	20		
								perpendicular dynamic	20		
INTERPRETATION ANALYST		—		bone or antler		antler scraping		—		soft wood or hide?	
				transverse						transverse	

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experiment 4
carving bone (26 min.)

		control set		analyst I		analyst II		analyst III		analyst IV	
MATERIAL	RETOUCH	medium	160	soft	180	medium	120	medium	160	soft	200
		soft	160	medium	160	soft	80	soft	140	medium	160
	POLISH	bone	190	hard wood	220	leather	150	hard wood	160	hide	120
		silicious plants	160	soft wood	180	meat or fish	130	soft wood	160		
				silicious plants	140	hide	120	soaked antler	90		
				soaked antler	130			bone	80		
				non silic. plants	80						
				dry antler	40						
				stone	40						
MOTION	RETOUCH	longitudinal	220	longitudinal	200	longitudinal	140	transverse	160	transverse	160
				carving	140	carving	80				
	POLISH	longitudinal	100	longitudinal	100	longitudinal	40	longitudinal	100	longitudinal	80
				carving	60	carving	40	carving	60	carving	40
						transverse	20				
INTERPRETATION ANALYST		—		wood longitudinal		butchering longitudinal		—		hide or butchering cutting/slicing	

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experiment 5
reaping cereals (30 min.)

MATERIAL		control set	analyst I	analyst II	analyst III	analyst IV
MATERIAL	RETOUCH	medium 60 soft 40	soft 200 medium 200	medium 160	soft 200 medium 160	soft 200 medium 200
	POLISH	cereals 270 non silic. plants 210 silicious plants 160	cereals 260 non silic. plants 240 silicious plants 210 soft wood 180 bone 90	cereals 150 silicious plants 80 soaked antler 80	soft wood 170 silicious plants 150 cereals 90 non silic. plants 90 bone 50 meat or fish 40	soft wood 200
MOTION	RETOUCH	no indications	longitudinal 200 carving 140	transverse 180	longitudinal 100 carving 60	longitudinal 80 carving 60
	POLISH	longitudinal 100 carving 60	longitudinal 80 carving 40	longitudinal 40 carving 40 transverse 20	carving 100 transverse 80 longitudinal 60 piercing 40	longitudinal 80 carving 40
INTERPRETATION ANALYST		—	silicious plants longitudinal	cereals longitudinal	—	silicious plants or soft wood longitudinal cutting/slicing

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experiment 6
cutting grass (30 min.)

		control set	analyst I	analyst II	analyst III	analyst IV
MATERIAL	RETOUCH	soft 200 medium 160	medium 120	medium 160	medium 160	soft 200 medium 160
	POLISH	silicious plants 220 soft wood 200 hard wood 170 cereals 170 soaked antler 140	silicious plants 220 soft wood 200 cereals 170 non silic. plants 140	non silic. plants 160 bone 120	cereals 120 soaked antler 120 bone 100 silicious plants 90	soft wood 200
MOTION	RETOUCH	longitudinal 200	transverse 160	transverse 160	longitudinal 160	longitudinal 100 carving 60
	POLISH	longitudinal 100	longitudinal 100 carving 40	longitudinal 40 transverse 20	longitudinal 140 carving 60	longitudinal 100 carving 60
INTERPRETATION ANALYST		—	soft wood longitudinal	silicious plants longitudinal	—	silicious plants or soft wood whittling/cutting

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experiment 7
scraping hide (60 min.)

		control set		analyst I		analyst II		analyst III		analyst IV	
MATERIAL	RETOUCH	medium	60	medium	60	medium	60	soft	200	medium	100
		soft	40	soft	40	soft	40	medium	160		
	POLISH	hide	200	—		hide	260	fish scales	140	meat or fish	80
								meat or fish	90		
MOTION	RETOUCH	no indications		no indications		no indications		transverse	160	transverse	260
	POLISH	transverse	100	transverse	80	transverse	140	—		longitudinal	100
		longitudinal	40			longitudinal	20				
INTERPRETATION ANALYST		—		hide or leather scraping		hide scraping		—		skin? wood? transverse	

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experiment 8
scraping hide (60 min.)

		control set	analyst I	analyst II	analyst III	analyst IV
MATERIAL	RETOUCH	medium 60	medium 80	medium 80	medium 200 / soft 120	medium 80
	POLISH	hide 230	hide 230	hide 280 / soaked antler 140 / leather 130	bone 140 / soaked antler 140 / hard wood 140 / soft wood 110 / meat or fish 100 / silicious plants 70 / non silic. plants 50	—
MOTION	RETOUCH	no indications	no indications	no indications	transverse 180	no indications 260
	POLISH	transverse 200	transverse 160	transverse 180 / longitudinal 20	transverse 160	transverse 240
INTERPRETATION ANALYST		—	hide scraping	hide scraping	—	skin scraping

experiment 9
butchering fish (35 min.)

		control set		analyst I		analyst II		analyst III		analyst IV	
MATERIAL	RETOUCH	medium	160	soft	220	medium	120	medium	200	medium	200
		soft	100	medium	120	soft	80	soft	120	soft	120
	POLISH	bone	220	—		soaked antler	120	hard wood	200	leather	130
		meat or fish	180					soft wood	180	hide	100
								bone	140	meat or fish	100
								soaked antler	140		
								silicious plants	140		
								non silic. plants	100		
								dry antler	40		
MOTION	RETOUCH	longitudinal	160	longitudinal	100	transverse	180	longitudinal	140	longitudinal	80
		carving	120	carving	60			carving	80	carving	60
	POLISH	longitudinal	100	longitudinal	100	longitudinal	140	longitudinal	100	transverse	60
		carving	40	carving	40			carving	40	longitudinal	40
										carving	20
										piercing	20
INTERPRETATION ANALYST		—		fish butchering longitudinal		hide longitudinal		—		skin butchering longitudinal	

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experiment 10
splitting wood (20 min.)

	control set	analyst I	analyst II	analyst III	analyst IV
RETOUCH	medium 140	no indications	medium 160	medium 200	medium 100
POLISH	soft wood 210 silicious plants 210 hard wood 200 soaked antler 160 non silic. plants 130	—	hard wood 250 soft wood 220 bone 220 soaked antler 220 cereals 210 silicious plants 210	bone 140 soaked antler 120	silicious plants 240 soft wood 230 hard wood 210 soaked antler 190 cereals 180 non silic. plants 140
MOTION — RETOUCH	no indications	no indications	—	—	—
POLISH	carving 60 boring 40	carving 120 piercing 60	piercing 20	carving piercing 40 20	transverse 60 longitudinal 40 carving 20 piercing 20
INTERPRETATION ANALYST	—	hard vegetal material carving	hard wood boring	—	wood graving

experiment 11
scraping hide (115 min.)

		control set		analyst I		analyst II		analyst III		analyst IV	
MATERIAL	RETOUCH	medium	160	medium	140	medium	80	medium	80	medium	100
	POLISH	hide	280	hide	240	hide	230	hard wood soft wood bone meat or fish	170 160 40 40	hide	230
MOTION	RETOUCH	—		longitudinal carving	80 80	no indications		transverse	180	transverse	200
	POLISH	transverse	160	transverse perpendicular dynamic	200 120	transverse longitudinal	140 20	transverse	120	transverse perpendicular dynamic	200 100
INTERPRETATION ANALYST		—		hide or leather scraping		hide scraping		—		skin scraping	

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experiment 12
carving clay (20 min.)

		control set		analyst I		analyst II		analyst III		analyst IV	
MATERIAL	RETOUCH	medium	80	medium	80	medium	160	medium	120	medium	80
	POLISH	dry clay	260	—		—		meat or fish	150	hide	280
		hide	170					bone	140	leather	50
		leather	60					hard wood	140		
		soft wood	60					soft wood	110		
								soaked antler	90		
								silicious plants	80		
								non silic. plants	70		
MOTION	RETOUCH	no indications		no indications		—		boring	160	no indications	
	POLISH	carving	60	carving	120	carving	120	carving	20	carving	60
				piercing	60	piercing	60	piercing	20		
INTERPRETATION ANALYST		—		clay or pottery carving		bone carving		—		hide graving	

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experiment 13
scraping wood (20 min.)

		control set	analyst I	analyst II	analyst III	analyst IV
MATERIAL	RETOUCH	medium 200 soft 80	soft 200 medium 160	soft 200 medium 160	medium 100	soft 160 medium 80
	POLISH	hard wood 200 soft wood 180 silicious plants 140 soaked antler 110 non silic. plants 100 dry antler 40	fish scales 140	hide 180 soft wood 150 soaked antler 80	hard wood 100 soft wood 90 silicious plants 80 soaked antler 70 cereals 60 bone 40	leather 160 meat or fish 120 hide 100
MOTION	RETOUCH	longitudinal 140	transverse 180	transverse 120	longitudinal 160 carving 80	transverse 120
	POLISH	transverse 100 longitudinal 40 carving 20 piercing 20	carving 100 transverse 80 longitudinal 80 piercing 40	longitudinal 100 carving 60	longitudinal 100 carving 60	longitudinal 40 carving 40 piercing 40 transverse 20
INTERPRETATION ANALYST		—	animal material transverse (fish scaling?)	unknown material longitudinal	—	skin butchering scraping/slicing

experiment 14
carving bone (45 min.)

MATERIAL / MOTION		control set	analyst I	analyst II	analyst III	analyst IV
MATERIAL	RETOUCH	medium 60 / soft 40	hard 300	medium 80	medium 140	medium 100
	POLISH	bone 190 / soaked antler 160 / silicious plants 160 / non silic. plants 150 / hard wood 140	—	bone 120	bone 180 / silicious plants 170 / hard wood 140	bone 160 / meat or fish 150 / non silic. plants 90
MOTION	RETOUCH	no indications	— 180	no indications	—	boring 80
	POLISH	carving 60	transverse 80	transverse 240	piercing 60	carving 60 / piercing 60
INTERPRETATION ANALYST		—	bone carving	bone carving	—	bone scraping/graving

experiment 15
sawing shell (10 min.)

		control set	analyst I	analyst II	analyst III	analyst IV
MATERIAL	RETOUCH	no indications	medium 60 soft 40	medium 120 soft 120	soft 220 medium 160	—
	POLISH	soft wood 120 soaked antler 110 silicious plants 90 non silic. plants 120 bone 100	hard wood 270 soft wood 190 soaked antler 170 silicious plants 130 cereals 70 dry antler 40 stone 40	bone 220 soaked antler 190 soft wood 170 leather 140 hide 120	cereals 170 bone 160 soft wood 120 silicious plants 120	hide 190 fish scales 120 soaked antler 110 leather 110 meat or fish 90
MOTION	RETOUCH	no indications	no indications	longitudinal 80	longitudinal 80	—
	POLISH	longitudinal 80 carving 40 piercing 40 transverse 20	longitudinal 80 carving 40	longitudinal 100	transverse 60 longitudinal 20 carving 20 piercing 20	transverse 60 longitudinal 20 carving 20 piercing 20
INTERPRETATION ANALYST		—	bone or antler sawing	bone sawing	—	bone/butchering? scraping/slicing